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The Afrotropical species of *Prosopantrum* Enderlein (Diptera: Cnemospathididae)

by

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ABSTRACT

Prosopantrum acrostichale sp. n. (Nigeria), *P. congolense* sp. n. (Republic of Congo) and *P. demeteri* sp. n. (Nigeria) are described. A generic diagnosis is given and a key is presented for the identification of the four species known from sub-Saharan Africa. Some pecularities of the male and female genitalia of Cnemospathididae are stressed.

INTRODUCTION

All or most of the more than 10 genera which were traditionally relegated to the Heleomyzidae (or Heleomyzoidea) in the southern hemisphere, particularly in southern South America, may belong to this family. All those genera need revision and no important contribution has been added to Malloch's (1933) work (e.g. by McAlpine 1985). For instance, the position of the subantarctic *Notomyza* Malloch with its (secondarily) symmetrical postabdomen is questionable (its 7th and 8th segments not sclerotised, cerci fused below anus, aedeagus short, etc (see Griffiths (1972), who regarded it as the separate family Notomyzidae). *Notomyza abrupta* Malloch, 1933, was studied by the present author and a seemingly complete symmetry in male genitalia was observed.

The genus *Prosopantrum* Enderlein with 12 or more species is known from the southern parts of South America and from the South Pacific and South Atlantic islands. One species, *P. flavifrons* (Tonnoir & Malloch), which was described from New Zealand but is widespread also in South America and Tasmania, has been repeatedly collected from the sea-shores of England (lsmay and Smith 1996, Cole 1996), as a consequence of a quite recent introduction. Parthenogenetic populations were also known from the mainland of South Africa (Cogan 1971). Adults have been found on human faeces and on carrion. The immature stages are unknown.

The family Cnemospathididae is not separated from Heleomyzidae in Barraclough's (1995) key; however, some important differentiating characteristics are given in the new Palaearctic Diptera manual by Papp (1998). He used the name Cnemospathidae, but 'A longer stem appears to be correct' (Sabrosky 1999).

A general description of *Prosopantrum* is given below, in order to save repetitions in descriptions of the species.

MATERIALS AND METHODS

The specimens are double-mounted (minuten-pinned); the abdomens with genitalia of some specimens were prepared with hot sodium hydroxide, washed, and preserved in glycerine in a plastic microvial.

The type specimens are deposited in the Diptera collection of the Department of Zoology, Hungarian Natural History Museum, Budapest (below: HNHM).

Only the differentiating characteristics are described below, particularly for those of the genitalia.

TAXONOMY

Genus *Prosopantrum* Enderlein

Gena broad, palpi long and slender. Postocellar bristles strong, crossing. Strong postscutellum present. Zero to 3 or 4 pairs of strong acrostichals, 1 + 2–3 dorsocentrals and 2 pairs of katepisternals, anepimeron bare. Costal spines absent or weak. Apex of subcosta fused with R1 before reaching costal vein. Anal vein short, no trace of axial vein. Mid tibia apically and subapically with strong setae: dorsal pre-apicals strong plus several long and thick bristles ventro-apically, anterodorsally, dorsally and posterodorsally.

Male postabdomen with comparatively large and nearly symmetrical tergite 6; sternite 6 and sternite 7 mostly ventral on left side without any traces of tergites 7 and 8. Epandrium with a cranial process on left side (Fig. 14), cerci rather large. Surstyli fused to epandrium (Figs 5, 11, 15). Ejaculatory apodeme minute but discernible (contrarily to Griffiths 1972). Aedeagus extremely long, flexible, ribbon-like, composed of 3 parts, coiled around the whole genitalia when at rest, covered by numerous, partly very thick, setae; usually a large hood-like epiphallus present. Aedeagal apodeme short and robust, fused medially to hypandrium; base of aedeagal apodeme extensively fused to phallophore. Gonopods definitely asymmetrical, of an intricate form, left one with 2 processes (e.g. Fig. 6), right one with 1–2 processes. Parameres long, connected to basiphallus only dorsally but connected to gonopods on a long section. Subepandrial sclerite (Fig. 14) small, only over phallophore, not extending more cranially than base of surstyli; the 2 halves of subepandrial sclerite not fused medially. Hypandrium with broad basis on subepandrial sclerite, asymmetrical with a short medial asymmetrical cranial process (Fig. 15).

Key to the Afrotropical species of *Prosopantrum*

1 Posterodorsal spine of mid tibia as far from dorsal spine as to tip of tibia. At least 2 pairs of enlarged acrostichals present 2

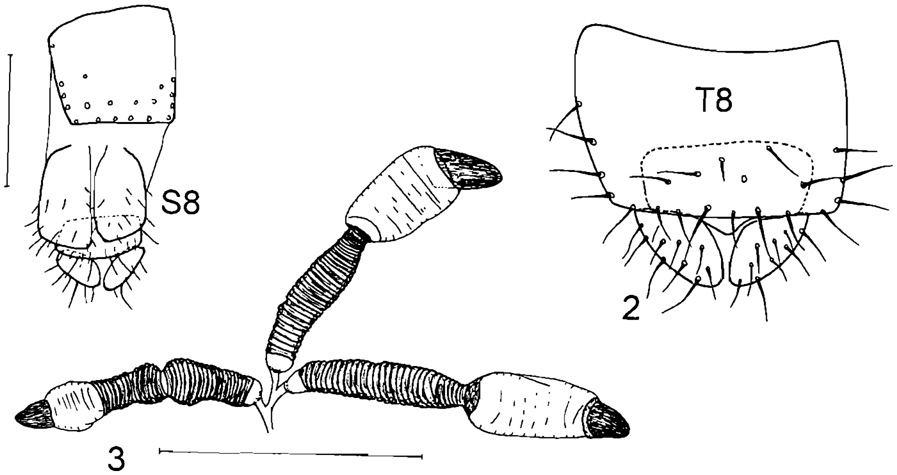
– Posterodorsal spine of mid tibia much closer to tip of tibia than to dorsal spine. No enlarged acrostichal pairs, at most 1 or 2 irregularly placed larger acrostichals 3

2 Femora fuscous. Female cerci less short with at least 1 pair of longer bristles, also hypoproct with longer setulae (Fig. 17). Dark dots at bases of all mesonotal hairs and bristles .... **flavifrons** (Tonnoir & Malloch, 1927)

– Femora ochreous. Female cerci extremely short with short hairs only, hypoproct without longer setulae (Figs 1–2). Dark dots at bases of mesonotal hairs and bristles not discernible..**acrostichale** sp. n.

3 Anterior upper fronto-orbital half to two-thirds length of posterior one. Mesonotum bluish grey. Male genitalia with shorter and broader surstylus and left gonopod with long thin anterior process (Figs 5–6)..............**congolense** sp. n.

– Anterior upper fronto-orbital three-quarters to four-fifths length of posterior one. Mesonotum yellowish grey. Male genitalia with long thin surstylus and left gonopod with short blunt anterior process (Figs 11–12).................**demeteri** sp. n.



Figs 1–3. *Prosopantrum acrostichale* sp. n., female paratype. 1. Postabdomen, ventral view. 2. Postabdomen, dorsal view, higher magnification. 3. Spermathecae. (S8: sternite 8, T8: tergite 8). Scale bars = 0.2 mm.

Prosopantrum acrostichale sp. n.

Figs 1–3

Etymology: The specific epithet refers to the presence of strong acrostichal setae.

Holotype ♀: NIGERIA: Wikki, bivaly ürülék [on buffalo dung], 3–15.viii.1978., leg. Demeter (HNHM). Paratypes: 2♀: data same as for holotype (HNHM).

Dimensions (in mm): Body length 2.83 (holotype), 2.67–3.08 (paratypes); wing length 3.42 (holotype), 3.25–3.58 (paratypes); wing width: 1.45 (holotype), 1.44–1.47 (paratypes).

Colour: Thorax and abdomen dull grey, with dense grey microtomentum, wings light yellowish grey, veins yellow.

Head: Frons and genae mostly ochreous, vertex and occiput grey. Anterior ors 0.197 mm, posterior ors 0.274 mm (holotype), i.e. anterior ors 0.72 as long as posterior one. Peristomals below and beside vibrissa comparatively short. Genae wide, below eye wider than largest diameter of fore femur.

Thorax, wing: Two or three pairs of enlarged acrostichals present, acrostichals otherwise scattered, only 4 not well arranged rows. 1 + 3 pairs of dorsocentrals, though presutural dc not much longer than microchaetae. Both katepisternals long and thick. Distal section of vein M 1.20 mm, inter-crossvein section 0.60 mm, i.e. exactly half as long.

Femora ochreous, legs otherwise yellow. Posterodorsal spine of mid tibia as far from dorsal spine as to tip of tibia, mid tibia with 2 strong ventro-apical spurs. Both fore and hind tibiae with dorsal pre-apical, which is *ca.* 1.5 times as long as tibial diameter at insertion.

Abdomen: Abdominal tergite 8 short with some short bristles in its distal half, sternite 8 bipartite, comparatively large (Fig. 1), both hypoproct and epiproct subquadratic, hypoproct with short bristles only.

Female cerci extremely short with very short setulae (Figs 1–2). Spermathecae (Fig. 3) similar to those of *flavifrons*; less sclerotised part of distal section easily distorted, or shortened; this is why possible differences are not stressed (spermathecae are probably slightly shorter than in *flavifrons*).

Male: Unknown.

Discussion: *Prosopantrum acrostichale* keys out to couplet 4 in Malloch's (1933) key; however, unlike *P. varifrons* the interfrontalia at the sides of the ocellar triangle are yellowish grey. Differences from *P. flavifrons*, which is thought to be its closer relative, are presented in the key above.

Prosopantrum congolense sp. n.

Figs 4–9

Etymology: The specific epithet refers to the type locality.

Holotype ♂: CONGO: Sibiti, IRHO, 9–27.xi.1963., leg. Balogh, Zicsi. Paratypes: 5♀: same data as holotype (4 in HNHM, 1 in Natal Mus.).

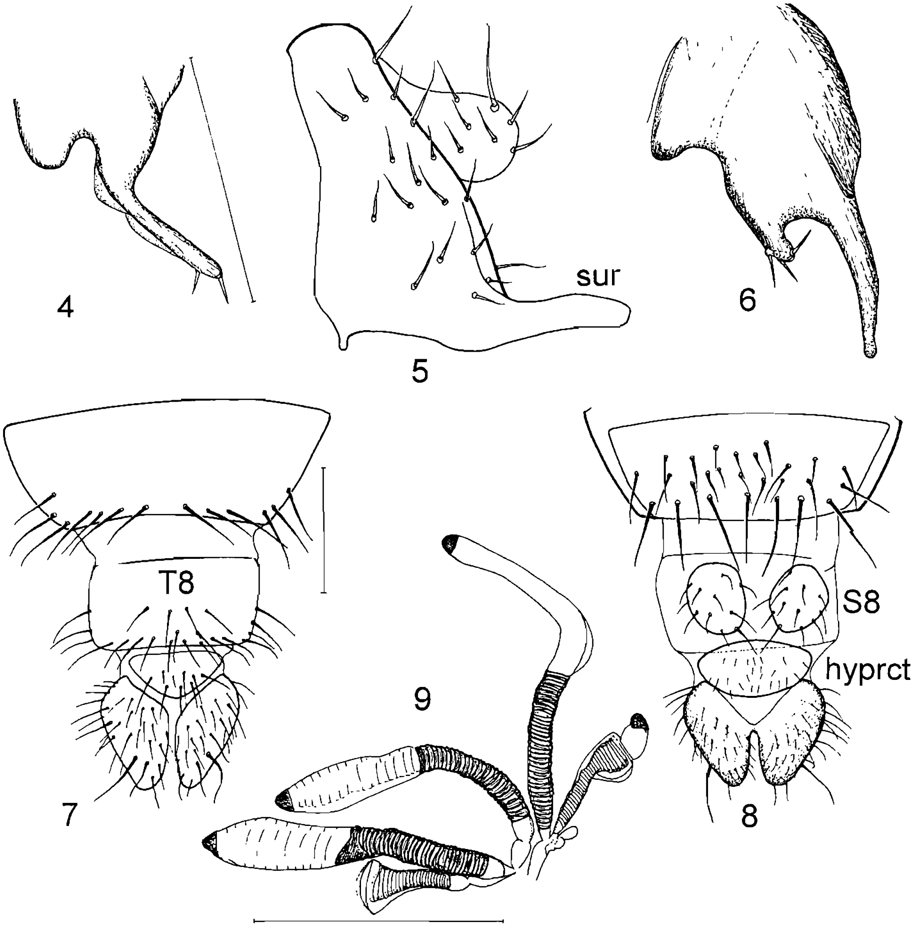
Dimensions (in mm): Body length 3.33 (holotype), 2.71–3.75 (paratypes); wing length 3.75 (holotype), 3.34–4.33 (paratypes); wing width: 1.37, 1.20–1.66 (paratypes).

Colour: Mesonotum bluish grey, margin of scutellum, humeral callus and notopleuron yellowish, pleurae brownish.

Head: Frons and genae yellow, vertex and occiput rather light grey. Antennae all yellowish grey, first flagellomere darker grey. Genae broad, longitudinal axis of eye 0.565 mm, gena below eye 0.29 mm on a paratype. Anterior upper fronto-orbital half to two-thirds length of posterior one, i.e. 0.145/0.255 mm on holotype, 0.145/0.24 mm on a paratype. Peristomals and genal bristles short.

Thorax, wing: Enlarged acrostichal pairs absent, or 1–2 irregularly placed enlarged acrostichals; otherwise in 6–8 irregular rows. 0 + 3 pairs of dorsocentrals, anterior one just on suture. Distal section of vein M not much longer than inter-crossvein section: 1.145/0.855 mm on holotype, 1.025/0.685 mm on a paratype.

Posterodorsal spine of mid tibia closer to tip of tibia than to dorsal spine; i.e. this species is intermediate between the two groups of species which Malloch (1933)



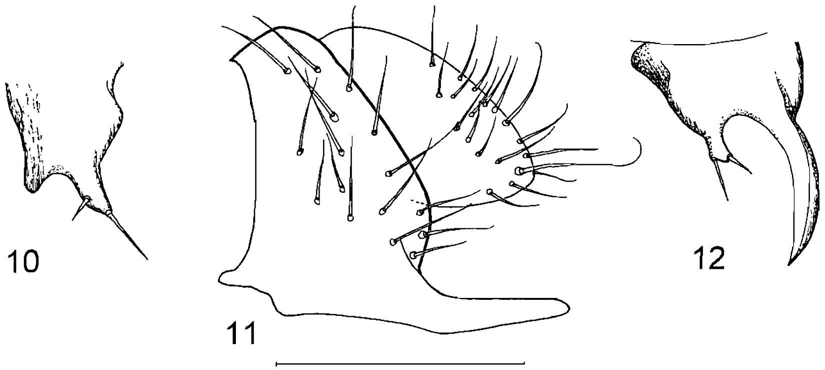
Figs 4–9. *Prosopantrum congolense* sp. n.. 4–6. Male genitalia, holotype: 4. Right gonopod. 5. Epandrium, cercus and surstylus laterally, left face. 6. Left gonopod. 7–9. Female paratype. 7. Postabdomen dorsally. 8. Postabdomen ventrally. 9. Spermathecae. (hyprct: hypoproct, sur: surstylus, S8: sternite 8, T8: tergite 8). Scale bars = 0.2 mm.

separated in his key. Mid femur anteriorly with 2–3 (rarely 4) strong thick setae on distal third.

Abdomen: Male cerci comparatively small (Fig. 4), surstylus short and broader than in *demeteri* (Fig. 4). Left gonopod (Fig. 6) with short blunt anterior process which bears 3 short setae, posterior process long and thin, narrowly blunt apically; right gonopod (Fig. 5) differs strongly from that of *demeteri*: apical process long and thin with 2 short setae. Aedeagus extremely long, apex not thinned, i.e. abruptly terminated as in *P. demeteri*.

Female tergite 7 medium to large with some thin bristles on distal margin, tergite 8 small, sternite 8 bipartite, round (Fig. 8), hypoproct small, epiproct minute (Fig. 7); cerci comparatively large (largest of African species, Figs 7–8), with short hairs only. 5 spermathecae: medial 3 similar to those of other *Prosopantrum* species, 2 lateral ones shorter, particularly their distal part ('knob'). [I found variation in the size and shape of the 2 additional spermathecae (not so for the 3 well-developed ones), which is difficult to differentiate from the effect of the potassium or sodium hydroxide, since the additional spermathecae are less sclerotised].

Discussion: *P. congolense* may key out to couplet 4 or 5 in Malloch's (1933) key, the position of its mid tibial thorns being intermediate. However, it is not closely related to any of the South American species. Its closest relative is probably *P. demeteri* sp. n. (see above key). The female's pecularity (i.e. five spermathecae) cannot be properly evaluated, because of lack of data on other *Prosopantrum* species.



Figs 10–12. *Prosopantrum demeteri* sp. n., male holotype. 10. Right gonopod. 11. Epandrium, cercus and surstylus laterally, left face. 12. Left gonopod. Scale bar = 0.2 mm.

Prosopantrum demeteri sp. n.

Figs 10–12

Etymology: This species is named after Dr András Demeter, who collected specimens of two of the three new *Prosopantrum* species in Nigeria.

Holotype ♂: NIGERIA: Wikki, bivaly ürülék [on buffalo dung], 3–15.viii.1978., leg. Demeter (HNHM) (in poor condition, abdomen with genitalia in microvial). Paratype: 1 ♀: same data as holotype (HNHM).

Dimensions (in mm): Body length 3.33 (holotype), 3.58 (paratype); wing length 3.79 (holotype) and 4.50 (paratype); wing width 1.54 (holotype) and 1.66 (paratype).

Colour: Mesonotum yellowish grey, scutellum, notopleuron and coxae yellowish, pleura light brownish grey, abdomen rather light grey with dense yellowish grey microtomentum.

Head: Frons, including most of vertex, and genae yellow, occiput grey. Antennae yellow but first flagellomere darker grey. Anterior upper fronto-orbital three-quarters to four-fifths length of posterior one, i.e. 0.257/0.36 mm on holotype, 0.308/0.393 mm on paratype. Genae very wide: longitudinal axis of eye (paratype) 0.56 mm, with genae below eye 0.32 mm; peristoma with only 1 longer peristomal behind vibrissa, genal hairs otherwise comparatively short.

Thorax, wing: Enlarged acrostichals absent, acrostichal microchaetae in *ca.* 8 irregular rows between anterior dc; 0 + 3 dorsocentral pairs. Wings yellowish grey, veins yellow. Distal section of vein M 1.40 mm, inter-crossvein section 0.89 mm, i.e. ratio 1.58 only.

Leg mostly yellow, femora with some greyish microtomentum. Posterodorsal spine of mid tibia much closer to tip of tibia than to dorsal spine. Mid femur anteriorly with 4 strong thick setae in apical third. Ventro-apical spurs of mid tibia extremely long, the longer one 0.393 and 0.41 mm on type specimens.

Abdomen: Male surstylus (Fig. 11) very long and thin, cerci very large; left gonopod (Fig. 12) with 2 processes: anterior one short and blunt with 2 bristles, posterior process long and sickle-shaped; right gonopod (Fig. 10) with anterior process much longer than posterior one, its anterior process with 1 long and 1 short bristles. Aedeagus extremely long, apex not thinned (as wide as other parts of distal fourth of distiphallus), i.e. abruptly terminated as in *P. congolense*.

Female cerci short, similar to those of *flavifrons*, both epiproct and hypoproct short with short setulae (female abdomen not dissected).

Discussion: *P. demeteri* keys out to couplet 5 in Malloch's (1933) key; however, *P. inerme* is a much smaller species with very different male genitalia. It is closely related to *P. congolense*; the differences are summarised in the key above.

Prosopantrum flavifrons Tonnoir & Malloch, 1927

Figs 13–18

Material examined: SOUTH CHILE: Patagonia: 1♂2♀: Torres del Paine Nat. Park – Paine 2 (or) 4, 14–15.ii.85, leg. M. Vogel (HNHM); 14♀: c. 15 km E Punta Arenas, Chabunco – soil traps, 6–19.ii.85 (HNHM). SOUTH ARGENTINA: 1♀: Rio Negro, El Bolsón, Topál – Nr. 540, 8.ix.61 (HNHM). SOUTH AFRICA: 1♀: W. Cape, Strandfontein 3418BA, Groot-Sandleegte, 10–12x.1977, R. M. Miller (Natal Mus.).

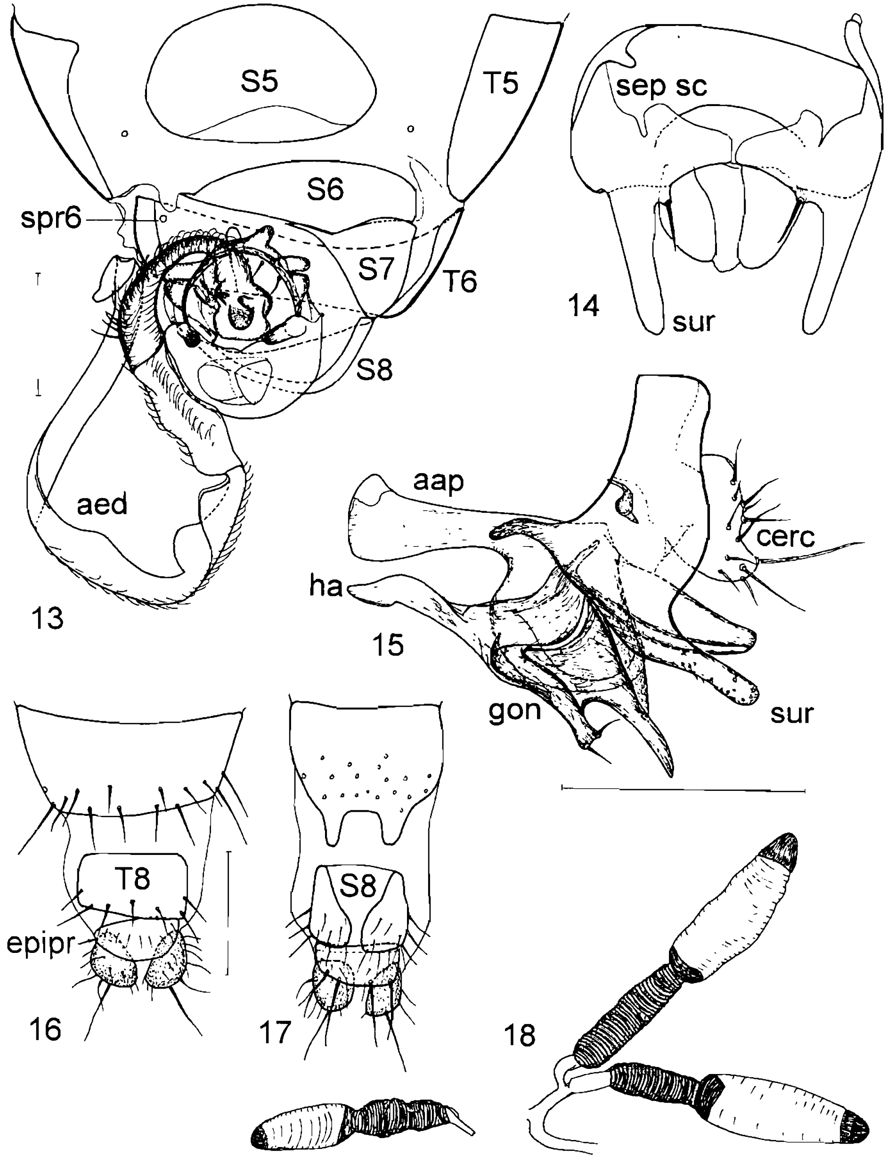
Dimensions (in mm): Body length 2.29–3.67 (S.Ch.), 3.42 (S.Afr.); wing length 2.54–3.83 (S.Ch.), 3.67 (S.Afr.); wing width: 0.86–1.44 (S.Ch.), 1.35 (S.Afr.).

Colour: Mesonotum and abdomen dark grey with darker brown dots at bases of setae. Antennae reddish yellow, apical half of first flagellomere dark grey. Femora fuscous. Other body characteristics as in Malloch (1933: 200–201).

Thorax: Posterodorsal spine of mid tibia as far from dorsal spine as to tip of tibia. At least 2 pairs of enlarged acrostichals present.

Abdomen: Male cerci not large, surstylus digitiform, blunt apically (Fig. 14); left gonopod with 2 processes: anterior one short and blunt with 2 medium long bristles, posterior process long and rather sharp apically; right gonopod similar, but its posterior process shorter. Aedeagus extremely long (Fig. 13), curved around entire genitalia when at rest, with numerous thick hairs but without processes. Apex of distiphallus thinned as in Fig. 13, or fig. 42a of Malloch (1933).

Female cerci with numerous bristles, definitely longer than short setulae on cerci of *P. acrostichale* (Figs 16–17, cf. Figs 1–2). Spermathecae (Fig. 18): distal part similar to finger of a soft glove with a thimble on tip (where better sclerotised);



Figs 13–18. *Prosopantrum flavifrons* (Tonnoir & Malloch). 13–15: Male genitalia. 13. Postabdomen and genitalia in ventral view. 14. Epandrium with surstyli and subepandrial sclerite, ventral view. 15. Genitalia in lateral view, left face. 16. Female postabdomen, dorsal view. 17. Female postabdomen, ventral view. 18. Spermathecae. (aap: aedeagal apodeme, aed: aedeagus, cerc: cercus, epipr: epiproct, gon: gonopod, ha: hypandrium, sep sc: subepandrial sclerite, spr6: 6th spiracle, sur: surstylus, S: sternite, T: tergite). Scale bars = 0.2 mm.

proximal part consists of well-sclerotised rings; basal section very short in all 3 spermathecae, so it is difficult to separate 'paired' and 'unpaired' ones.

Discussion: This is the only widely distributed species of *Prosopantrum;* the differences in size of specimens within populations are significant. Malloch's (1933) figure of the male genitalia does not disagree with mine, but is less detailed. It is not possible to depict all the important characters of the genitalia in one figure.

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